# THz stimulated emission from simple superlattice in positive differential conductivity region

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Narrow band emissions at 2.6−2.8 THz are observed out of liquid helium cooled 1 mm disk chips prepared of a wafer with the very low n type doped weak barrier GaAs−GaAlAs superlattice of 1000 periods. The emissions are at about 8.0−18.0 V pulsed voltage applied to the chips in region of the chips positive DC differential conductivity that guaranties absence of inhomogeneous electric field domains in the chips. The emission frequency bands are estimated with a cyclotron resonance filter; the measurements show that the band width is of about that of the THz quantum cascade laser. By using long voltage pulses the chip heating above 100 K is achieved without substantial change in emission power. We speculate that the emission is super luminescence (amplification) of whispering gallery modes in the chips as a result of inverted Wannier-Stark level transitions under bias. The results are the first world demonstration of THz stimulated emission in a simple superlattice within region of positive DC differential conductivity; they give strong impetus for development of THz and higher frequency sources based on such simple superlattices; the sources should well compete with the THz quantum cascade lasers in particular at elevated temperatures.

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